

Fig. 1

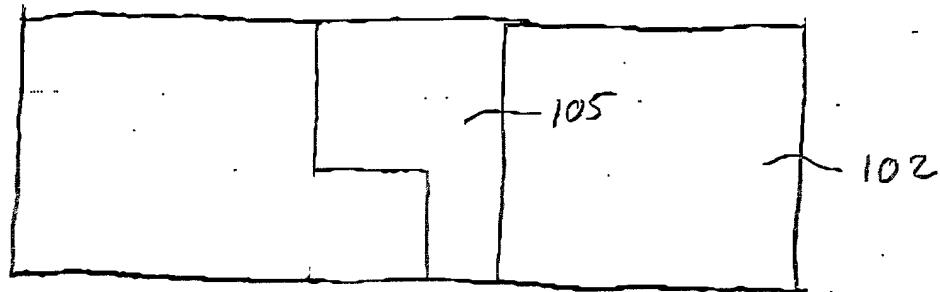


Fig. 2

10637

5

302

Form a copper layer overlying a patterned dielectric layer

304

Form a doped layer superjacent the copper layer

10

306

Thermally drive dopants from doped layer into copper layer

Fig. 3

5

502

Form a copper layer overlying a patterned dielectric layer

10

504

Remove excess metal so as to form individual copper interconnect lines

506

Implant dopants into at least the interconnect lines

Fig. 5

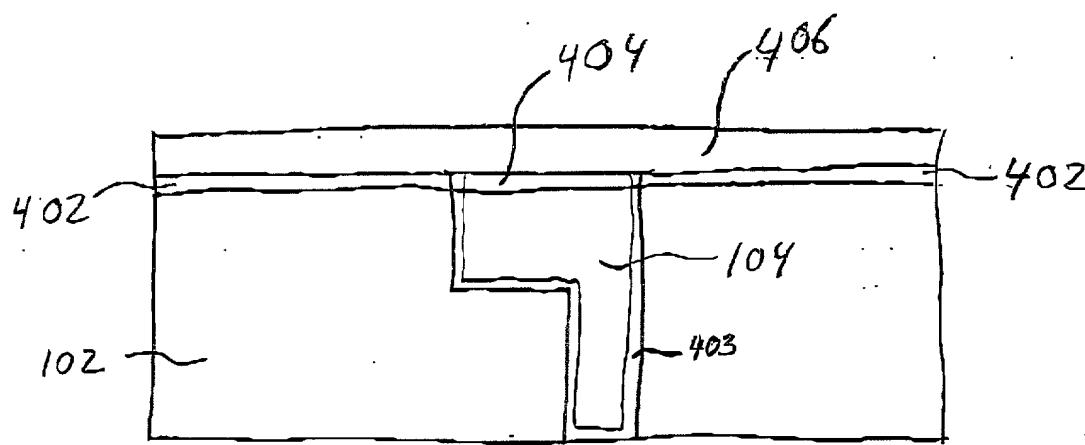


Fig. 4

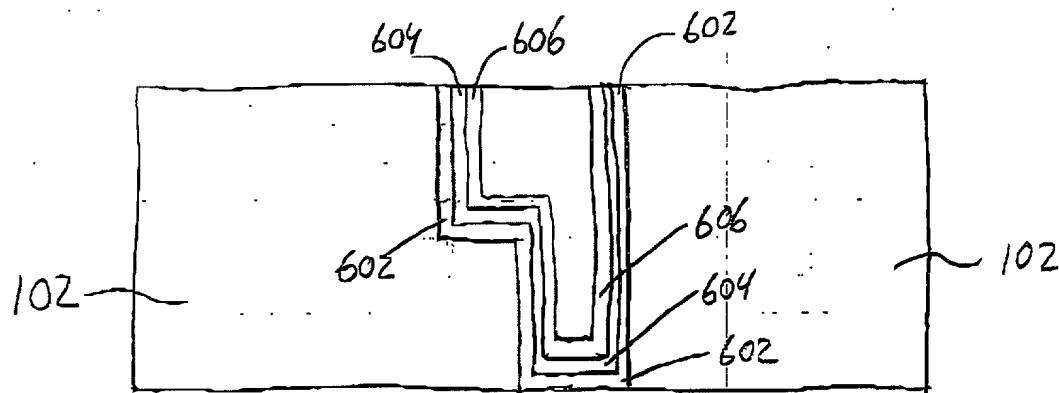


Fig. 6

P0637

Pattern a dielectric layer to form at least trenches therein

Form a copper-diffusion barrier over the surfaces of the patterned dielectric layer

Deposit a doped seed layer over the barrier layer

Deposit a capping layer over the doped seed layer without exposing the doped seed layer to the atmosphere

Fig. 7

802
Pattern a dielectric layer to form at least trenches therein

804
Form a copper diffusion barrier over the surfaces of the patterned dielectric layer

806
Deposit a doped seed layer over the barrier layer

808
Deposit a capping layer over the doped seed layer without exposing the doped seed layer to the atmosphere

810
Deposit a copper layer over the capping layer

812
Thermally drive dopants from doped seed layer to upper portions of copper layer while providing atmosphere that reacts with dopant species

Fig. 8